



DEPARTMENT OF THE ARMY  
U.S. Army Corps of Engineers  
WASHINGTON, D.C. 20314-1000

REPLY TO  
ATTENTION OF:

CECW-OR

8 MAR 1992

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Clarification and Interpretation of the 1987 Manual

1. The purpose of this memorandum is to provide additional clarification and guidance concerning the application of the Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1, January 1987, Final Report (1987 Manual). As discussed in my 20 February 1992 memorandum, procedures for the identification and delineation of wetlands must be fully consistent with both the 1987 Manual and the Questions and Answers issued 7 October 1991. The technical and procedural guidance contained in paragraphs 2 thru 6 below has been prepared by the Waterways Experiment Station (WES) and is provided as further guidance. The following guidance is considered to be consistent with the 1987 Manual and the 7 October Questions and Answers. Further, this guidance will be presented in the upcoming Regulatory IV wetlands delineation training sessions in FY 92. The alternative technical methods of data gathering discussed below are acceptable as long as the basic decision rules (i.e., criteria and indicators) established in the 1987 Manual are applied. Also enclosed is a revised data form which may be used in lieu of the routine data sheet provided with the 1987 Manual, if desired. As discussed in my 20 February 1992 memorandum to the field, regional approaches and/or alternative data sheets must be reviewed and approved by HQUSACE (CECW-OR) prior to regional implementation. Notwithstanding this requirement, we encourage interagency coordination and cooperation on implementation of the 1987 Manual. Such cooperation can facilitate the continued success of our use of the 1987 Manual.

2. Vegetation:

a. Basic rule: More than 50 percent of dominant species from all strata are OBL, FACW, or FAC (excluding FAC-) on the appropriate Fish and Wildlife Service regional list of plant species that occur in wetlands.

b. The 1987 Manual provides that the 3 most dominant species be selected from each stratum (select 5 from each stratum if only 1-2 strata are present). However, alternative ecologically based methods for selecting dominant species from each stratum are also acceptable. The dominance method described in the 1989 interagency manual is an appropriate alternative

method. (1989 Manual, p. 9, para. 3.3)

c. The 4 vegetation strata (tree, sapling/shrub, herb, and woody vine) described in the 1987 Manual are appropriate. However, a 5-stratum approach (tree, sapling, shrub, herb, and woody vine) is an acceptable alternative.

d. The 1987 Manual states on page 79 that hydrophytic vegetation is present if 2 or more dominant species exhibit morphological adaptations or have known physiological adaptations for wetlands. This rule should be used only after the basic rule is applied; use caution with adaptations (e.g., shallow roots) that can develop for reasons other than wetness. Furthermore, the morphological adaptations must be observed on most individuals of the dominant species.

e. In areas where the available evidence of wetlands hydrology or hydric soil is weak (e.g., no primary indicators of hydrology), the Facultative Neutral (FAC neutral) option may be used to help clarify a wetland delineation. Use of the FAC neutral option is explained in paragraph 35(a), page 23, of the 1987 Manual. Use of the FAC neutral option is at the discretion of the District. Further, the FAC neutral option cannot be used to exclude areas that meet the "basic vegetation rule" and the hydrology and hydric soil requirements.

### 3. Hydrology:

a. Areas which are seasonally inundated and/or saturated to the surface for a consecutive number of days for more than 12.5 percent of the growing season are wetlands, provided the soil and vegetation parameters are met. Areas wet between 5 percent and 12.5 percent of the growing season in most years (see Table 5, page 36 of the 1987 Manual) may or may not be wetlands. Areas saturated to the surface for less than 5 percent of the growing season are non-wetlands. Wetland hydrology exists if field indicators are present as described herein and in the enclosed data sheet.

b. To evaluate hydrologic data (e.g., from stream gages or groundwater wells) growing season dates are required. Soil temperature regime (i.e., period of the year when soil temperature at 20 inches below the surface is above 5 C) is the primary definition of growing season, but data are rarely available for individual sites. Broad regions based on soil temperature regime (e.g., mesic, thermic) are not sufficiently site-specific. For wetland determinations, growing season can be estimated from climatological data given in most SCS county soil

surveys (usually in Table 2 or 3 of modern soil surveys). Growing season starting and ending dates will generally be determined based on the "28 degrees F or lower" temperature threshold at a frequency of "5 years in 10." In the south, at the discretion of the district, it may be more appropriate to use the 32 degree F threshold.

c. In groundwater-driven systems, which lack surface indicators of wetland hydrology, it is acceptable to use local Soil Conservation Service (SCS) soil survey information to evaluate the hydrology parameter (p. 37 in the Manual) in conjunction with other information, such as the FAC neutral test. Use caution in areas that may have been recently drained.

d. Oxidized rhizospheres surrounding living roots are acceptable hydrology indicators on a case-by-case basis and may be useful in groundwater systems. Use caution that rhizospheres are not relicts of past hydrology. Rhizospheres should also be reasonably abundant and within the upper 12 inches of the soil profile. Oxidized rhizospheres must be supported by other indicators of hydrology such as the FAC neutral option if hydrology evidence is weak.

4. Soil:

a. The most recent version of National Technical Committee for Hydric Soils hydric soil criteria will be used. At this writing, criteria published in the June 1991 Hydric Soils of the United States are current. These criteria specify at least 15 consecutive days of saturation or 7 days of inundation during the growing season in most years.

b. Local Lists of Hydric Soil Mapping Units recently developed by SCS and available from county or State SCS offices give local information about presence of hydric soils on a site. When available, these local lists take precedence over the national list for hydric soil determinations.

c. SCS is currently developing regional indicators of significant soil saturation. Until finalized and adopted, these indicators may not be used for hydrology or hydric soil determinations.

d. The statement (p. 31 of the 1987 Manual) that gleyed and low-chroma colors must be observed "immediately below the A-horizon or 10 inches (whichever is shallower)" is intended as general guidance. Certain problem soils may differ.

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5. Methods:

a. As stated in the 1987 Manual (footnote, p. 76), alternative plot sizes and dominance measures are acceptable.

b. For comprehensive determinations involving a patchy or diverse herb layer, a single, centrally located 3.28 x 3.28-foot quadrat may not give a representative sample. As an alternative, the multiple-quadrat procedure presented in the 1989 Manual (p. 42) is recommended.

6. Problem Areas

a. Page 93, paragraph 78 of the 1987 Manual states that similar problem situations may occur in other wetland types; therefore, problem areas are not limited to this list.

b. Problem soil situations mentioned elsewhere in the Manual include soils derived from red parent materials, some Entisols, Mollisols, and Spodosols.

7. Questions concerning this information should be directed to Ms. Karen A. Kochenbach, HQUSACE (CECW-OR), at (202) 272-1784, or Mr. James S. Wakeley, WES, at (601) 634-3702.

Encl

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DISTRIBUTION:  
(SEE PAGE 2 & 3)

## IMPORTANT ADDRESSES

### Aerial Photography -- Sources of Photos

ASCS Aerial Photo Field Office  
P.O. Box 30010  
Salt Lake City, UT 84130  
(801) 524-5856

USGS EROS Data Center  
Sioux Falls, SD 57198  
(605) 594-6151

### Aerial Photography -- List of Sources

USGS National Cartographic Information Center  
507 National Center  
Reston, VA 22092  
(703) 860-6045

### Wetland Plant Lists

Publications Request Manager  
National Ecology Research Center  
US Fish and Wildlife Service  
2627 Redwing Road, Creekside One  
Fort Collins, CO 80526-2899  
(303) 226-9300

Porter B. Reed, Jr.  
US Fish and Wildlife Service  
National Wetlands Inventory  
9720 Executive Center Drive  
Suite 101 - Monroe Building  
St. Petersburg, FL 33702

### Hydric Soils List

National Technical Committee for Hydric Soils  
Soil Conservation Service  
P.O. Box 2890  
Washington, DC 20013

### National List of Scientific Plant Names

USDA Soil Conservation Service  
Office of Ecological Sciences  
P.O. Box 2890  
Washington, DC 20013  
(202) 447-2587  
Publ. No. SCS-TP-159 (1982)

### Keys to Soil Taxonomy

International Soils  
Dept. of Crop and Soil  
Environmental Sciences  
Virginia Tech  
Blacksburg, VA 24061-0404  
Cost: \$12.00

### Wetland Delineation Manual (1987 version)

National Technical Information Service (NTIS)  
Attn: Order Dept., Springfield, VA 22161  
Document Number ADA 176 734  
703-487-4650, FAX 703-321-8547  
Cost: \$26 plus \$3 shipping and handling

### National Wetland Inventory Maps

813-893-3863 (for Federal agencies; maps are free)  
1-800-872-6277 (for others; maps cost \$1.75 for paper,  
\$3.50 for mylar, and \$6.50 for shipping)

**A COMPARISON OF WETLAND DELINEATION MANUALS  
1987 (Corps of Engineers) and 1989 (Interagency)**

**Wetland Hydrology Criteria:**

1987	1989
<p><b>Criteria:</b></p> <p>Inundated or saturated to the surface for at least 5% of the growing season in most years (p. 36, 50).</p>	<p>Inundated or saturated to the surface for 7 or more consecutive days during the growing season in most years.</p>
<p><b>Definition of Saturation:</b></p> <p>Soil is saturated when the capillary fringe occurs within the major portion of the root zone (i.e., within 12 inches of the surface) (p. 38).</p>	<p>Soil is saturated when the capillary fringe reaches the surface. Water table can be at 6, 12, or 18 inches depending on soil drainage class and permeability.</p>
<p><b>Definition of Growing Season:</b></p> <p>Glossary says that growing season is the portion of the year when soil temperature at 20 inches is above 41 F (5 C), but that this period can be approximated by the number of frost-free days (above 32 F).</p>	<p>Growing season is regionally defined according to soil temperature regime (i.e., the period when soil temperature at 20 inches is above 41 F or 5 C).</p>
<p><b>Field Indicators:</b></p> <p>Independent evidence of wetland hydrology is required. Field indicators include, but are not limited to, direct observation of inundation or saturation, watermarks, drift lines, sediment deposits, and drainage patterns. Oxidized root channels and water-stained leaves are not mentioned in the list of field indicators; however, oxidized root channels were presented in training courses as strong evidence of current wet conditions.</p>	<p>Wetland hydrology can be assumed to be present if there is hydric soil and a hydrophytic plant community, and no evidence of hydrologic disturbance. Oxidized root channels and water-stained leaves are included in the list of field indicators.</p>

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# **Hydric Soil Criteria:**

1987	1989
<p><b>Criteria:</b></p> <p>Based on 1987 criteria developed by the National Technical Committee for Hydric Soils (NTCHS). Require 7 or more consecutive days of inundation or saturation during the growing season.</p>	<p>Specifies 1987 NTCHS criteria. However, NTCHS criteria were revised in 1990, and currently require 7 or more days of inundation or more than 14 days of saturation during the growing season.</p>
<p><b>Field Indicators:</b></p> <p>Field indicators include histic epipedons, sulfidic material, reducing soil conditions, gleyed and low-chroma colors, concretions, high surface organic content (sands), organic streaking (sands), organic pans (sands), and listing in "Hydric Soils of the United States". Soil colors are examined in the horizon immediately below the A-horizon or within 10 inches, whichever is shallower. Concretions noted in top 3 inches only. For Spodosols, no colors mentioned below the spodic horizon.</p>	<p>Field indicators are essentially the same as in 1987, except that soil colors are examined in the horizon immediately below the A-horizon. Ten-inch and 3-inch depth restrictions are dropped. Spodosols should have low-chroma colors below the spodic horizon.</p>
<p><b>Problem Soils:</b></p> <p>Recognized problem soils include Mollisols, Entisols, Spodosols, and soils derived from red parent materials. No reference to <i>Soil Taxonomy</i> for guidance.</p>	<p>Same list of recognized problem soils. Users are referred to <i>Soil Taxonomy</i> for guidance.</p>

# **Hydrophytic Vegetation Criteria:**

1987	1989
<b>Criteria:</b>  More than 50% of dominant species are OBL, FACW, or FAC (FAC- species do not count).	More than 50% of dominant species are OBL, FACW, or FAC (including FAC-); or frequency analysis of all species yields a prevalence index less than 3.0.
<b>Selection of Dominant Species:</b>  From each of four strata (trees, saplings/shrubs, herbs, woody vines) select the three most dominant species (select five if only one or two strata present).	Dominant species in each stratum are the most abundant species comprising more than 50% of the total dominance measure, plus any individual species that is at least 20% of the total dominance measure. Strata include trees, saplings, shrubs, herbs, woody vines, and bryophytes.
<b>Field Indicators:</b>  Other indicators include visual observation of species growing in areas with prolonged saturation, plant morphological adaptations, and technical literature. A FAC-neutral option is given if the indicator value of FAC species is questioned.	Any plant community growing on hydric soil and subject to wetland hydrology is considered to be hydrophytic. Plant morphological adaptations are hydrology field indicators. Vegetation is hydrophytic if coverage of OBL and FACW exceed that of FACU and UPL. Area is wetland if all dominants are OBL, and hydrology is not disturbed.



**Problem Wetland Situations:**

1987	1989
Problem areas include wetlands on drumlins, seasonal wetlands, prairie potholes, and vegetated flats.	Problem areas include FACU-dominated wetlands, evergreen forested wetlands, wetlands on glacial till, highly variable seasonal wetlands, interdunal swale wetlands, vegetated river bars, vegetated flats, caprock limestone wetlands, newly created wetlands, and problem soils given above.

**Wetland Determinations:**

1987	1989
<b>Wetland Identification:</b>  Minimum of one positive indicator of each parameter (wetland hydrology, hydric soils, hydrophytic vegetation) required.	Each parameter can be satisfied either with data that meet the criteria directly, or by presence of a field indicator. In some cases, information on one parameter may also satisfy another parameter. Problem Area section provides rules for FACU-dominated plant communities.
<b>Boundary Determinations:</b>  Upper limit of wetland is defined by the last point on the gradient where evidence of all three parameters is present.	Upper limit of wetland is defined by the last point on the gradient where all three criteria are satisfied. In the absence of significant hydrologic modification, the upper limit is often defined by the limit of either hydric soil or hydrophytic vegetation.